

CLAIM AMENDMENTS

1 1. (Currently amended) A two-phase hard metal substrate
2 body comprised of a WC hard material phase and a binder phase of 3
3 to 25 mass % which apart from at least one of the binder metals Fe,
4 Co and/or Ni contains up to 15 mass % of the binder phase dissolved
5 dopant selected from the group comprised of Al, Cr, V, Nb, Ta, Ti,
6 Zr, Hf, characterized in that the percentage proportion of all
7 doping agents in the hard metal is limited to a maximum of 4 mass %
8 in that the proportion of a cubic phase in the hard metal is less
9 than 4 volume % and in that the binder metal content in a hard
10 metal-substrate body boundary zone falls from up to 1 μm ,
11 preferably up to 0.5 μm to less than 0.5 times the binder content
12 in the substrate body interior.

1 2. (Currently amended) The two-phase hard metal
2 substrate body according to claim 1 characterized in that the
3 concentration of the binder phase falls gradually toward the
4 substrate body surface and the concentration of the dopant
5 gradually increases in a corresponding manner.

1 3. (currently amended) The two-phase hard metal
2 substrate body according to claim 1 characterized in that the grain
3 size of the WC is $\leq 1.5 \mu\text{m}$ whereby the WC fine hard metal (grain
4 size $\leq 0.8 \mu\text{m}$) and/or with WC ultrafine grain hard metal (grain
5 size $\leq 0.5 \mu\text{m}$), preferably contain Cr, V and/or Ta as dopant.

1 4. (Currently amended) The two-phase hard metal
2 substrate body according to claim 1 characterized in that at least
3 one layer is applied to the substrate body surface, the layer being
4 comprised of a carbide, nitride and/or carbonitride of Ti, Zr
5 and/or Hf and/or of Al_2O_3 , HfO_2 , ZrO_2 , oxides, amorphous carbon,
6 diamond, cubic boron nitride, carbon nitride (CN_x) or another
7 compound of at least one of the elements B, C, N and/or O.

1 5. (currently amended) The two-phase hard metal
2 substrate body according to claim 1 characterized in that in the
3 boundary zone close to the surface there is an enrichment with
4 nitride or carbonitride of the metal dopant.

1 6. (currently amended) A method of producing a two-
2 phase hard metal substrate body according to claim 1 in which the
3 starting mixture is preheated powder metallurgically is prepressed
4 to a green body and then in an atmosphere of a furnace is heated
5 and sintered, characterized in that in the heating phase, after
6 reaching the eutectic, but no later than reaching the sintering
7 temperature the vacuum or inert gas atmosphere is replaced with a
8 N_2 atmosphere with a N_2 pressure of $\leq 10^5$ Pa and is maintained at
9 least until the sintering temperature is reached.

1 7. (currently amended) The method of making a two-phase
2 hard metal substrate body according to claim 1 in which the
3 starting mixture is powder metallurgically treated and is pressed

4 to a green body and finally heated in an atmosphere of a furnace
5 and sintered, characterized in that after finish sintering or
6 optionally in a final treatment above the eutectic temperature, the
7 sintered body is maintained in a N_2 atmosphere under a pressure (p)
8 of $10^5 \text{ Pa} < p < 10^7 \text{ Pa}$ for at least 10 minutes.

1 8. (Previously presented) The method according to claim
2 6 characterized in that the nitrogen atmosphere is established by
3 introducing precursors that is N-containing gases whereby the
4 nitrogen is formed *in situ* in the gas atmosphere.

1 9. (currently amended) The method according to claim 6
2 characterized in that the two-phase hard metal substrate body is
3 heated up to 1250°C during the heating phase and this temperature
4 is held for at least 20 minutes, preferably more than 1 hour,
5 before the heating up is continued to the sintering temperature.

1 10. (Previously presented) The method according to
2 claim 6 characterized in that initially in the heating up phase at
3 about 1200°C the previously existing vacuum is replaced by an inert
4 gas atmosphere, preferably with a pressure of 10^3 Pa to 10^4 Pa and
5 only upon reaching the sintering temperature is a nitrogen
6 containing atmosphere established with a higher pressure,
7 preferably $\geq 10^4 \text{ Pa}$.

1 11. (Previously presented) The method according to
2 claim 6 characterized in that the heating up rate and the cooling
3 down rate amounts to up to 10°C/min, preferably between 2°C/min and
4 5°C/min.

1 12. (Currently amended) The method according to claim 6
2 characterized in that the starting mixture contains in an amount of
3 up to 15 mass % of the binder phase additional carbides, nitrides,
4 carbonitrides of the elements of Group IVa or VIa of the periodic
5 system or Al or complex carbides, complex nitrides and/or complex
6 carbonitrides of the form Ti_2AlC , Ti_2AlN , Cr_2AlN , Cr_2AlC .